60437 - Geohazards analysis and mitigation methods

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	541 - Master's in Geology: Techniques and Applications
ECTS	5.0
Course	1
Period	Second semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

Given the practical focus of the subject, learning activities are designed for the students to acquire the basis for identifying adequate approaches for the analysis of hazardous earth surface processes. They will also gain some experience on the practical application of some methods.

5.2.Learning activities

The subject's program includes the following activities:

60437 - Geohazards analysis and mitigation methods

● Theoretical sessions

Participative Master Classes. The theoretical sessions will be focused on the presentation of multiple approaches applied to the analysis of potentially hazardous earth surface processes. Lectures will be developed in a participative way presenting the theoretical foundation of the methods, describing their practical application, and explaining their strengths and weaknesses. Commonly, the approaches will illustrated by specific case studies investigated by the lecturers, some of which will be examined in the field.

●Lab sessions (cabinet y computer).

Resolution of problems and analysis of case studies. These practical sessions will start with brief methodological explanations aimed at introducing case studies, to be analysed by the students under the supervision of the lecturer. At the end of these sessions, the students will discussed their results and deliver them the lecturer.

● Field practices.

The field program will be developed in two journeys and a half (a journey is equivalent to 0.8 ECTS). Geological and geomorphic evidence of active hazardous processes will be examined in the field. The students will practice some field techniques.

Assessment details

The student must demonstrate that has achieved the intended background through the following evaluation activities:

Continuous evaluation

Attendance, reports and resolution of problems presented in practices (70% of the final grade).

Oral presentation and defense of the raised works (30% of the final grade).

Final exam

Final theoretical-practical examination for those who have not passed the subject through the continuous evaluation (100% of the final grade)

5.3.Program

PART 1: Mapping and characterization of hazardous processes

1. Geodetic tools (e.g. airborne and ground-based LIDAR, hand-held GPS, levelling instrument, DEMs).

2. Production of maps of active processes (e.g., remote-sensed imagery, LIDAR data, shaded relief models, SIG, Autocad).

3. Characterization of hazardous processes (e.g., soil erosion quantification, assessment of soil and water degradation, trenching, ground movement monitoring, shallow geophysical techniques).

PART 2 : Predictive models

1. Development and evaluation of susceptibility and hazard models

2. Direct and indirect risk models

PART 3 : Risk mitigation

1. Mitigation strategies

2. Cost-benefit analysis and risk acceptability

PART 4: Flooding hazard. Hydrometeorological and hydraulic models

Practical sessions

Lab sessions and Computer Lab sessions . Resolution of problems and analysis of case studies. These sessions will include practical exercises to be resolved individually or in groups under the supervision of the lecturer. Students will be also asked to prepare brief presentations.

Field practices . The field program will be developed in two journeys and a half (a journey is equivalent to 0.8 ECTS). The location of the visits and the topics to be addressed will be discussed with the students in order to better meet their interests.

5.4.Planning and scheduling

Schedule sessions and presentation of Works

Theoretical sessions: 16 hours

Lab sessions (cabinet y computer): 14 hours

Field practices: 20 hours

Others (student's own work): 75 hours

Total: 125

60437 - Geohazards analysis and mitigation methods

The planned schedule is : It is according to approved schedule to be published in the bulletin board of the Department of Geosciences.

Presentation of exercises:Reports and exercises of practices cabinet will be delivered next week at the beginning of the session.

5.5.Bibliography and recomended resources

- Alexander, David.. Natural disasters / David Alexander . - Reprinted London : Routledge, 2002.
- Bell, Frederic Gladstone. Geological hazards : their assessment, avoidance, and mitigation / F.G. Bell London : Spon, 2003
- Coch, Nicholas K.. Geohazards : natural and human / Nicholas K. Coch Englewood Cliffs (New Jersey) : Prentice Hall, cop. 1995
- Geomorphological hazards and disaster prevention / [edited by] Irasema Alcántara-Ayala , Andrew S. Goudie Cambridge : Cambridge University Press, 2010
- Geomorphology for engineers/ Edited by P. G. Fookes, E. M. Lee, G. Milligan Dunbeath : Whittles publishing, 2005
- Keller, Edward A.. Riesgos naturales : procesos de la Tierrra como riesgos, desastres y catástrofes / Edward A. Keller , Robert H. Blodgett . - [1ª ed.] Madrid : Pearson, D. L. 2007
- Riesgos naturales / Francisco Javier Ayala-Carcedo, Jorge Olcina Cantos (coordinadores) . - 1a. ed. Barcelona : Ariel, 2002